

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

Claim 1 (currently amended): An electroionic apparatus for disinfection and oxidation of an aqueous solutions solution comprising:

an a high frequency AC power source coupled to a flow cell, said power source including a signal generator supplying a high frequency AC signal to a power amplifier for amplifying the signal and an impedance matching transformer coupled to said power amplifier for connecting said signal to said flow cell, said power source creating an electromagnetic field within said flow cell and creating an ionic current flow in said flow cell;

said AC power source operable to create an electromagnetic field around said flow cell;
and

wherein said aqueous solutions pass through said flow cell.

Claim 2 (currently amended): The electroionic apparatus of claim 1 wherein said flow cell is inductively-coupled to said aqueous solution.

Claim 3 (currently amended): The electroionic apparatus of claim 1 wherein said flow cell is capacitively-coupled to said aqueous solution.

Claim 4 (currently amended): The electroionic apparatus of claim 1 wherein said flow cell is ~~directly coupled~~ directly-coupled to said aqueous solution.

Claim 5 (currently amended): ~~The electroionic apparatus of claim 1~~ An electroionic apparatus for disinfection and oxidation of an aqueous solution comprising:

a high frequency AC power source coupled to a flow cell, said power source including a signal generator supplying a high frequency AC signal to a power amplifier for amplifying the signal and an impedance matching transformer coupled to said power amplifier for connecting said signal to said flow cell, said power source creating an electromagnetic field within said flow cell and creating an ionic current flow in said flow cell;

~~wherein said aqueous solution contains water and oxygen and~~ said ionic current flow generates hydrogen peroxide in said aqueous solution.

Claim 6 (currently amended): ~~The electroionic apparatus of claim 1~~ An electroionic apparatus for disinfection and oxidation of an aqueous solution comprising:

a high frequency AC power source coupled to a flow cell, said power source including a signal generator supplying a high frequency AC signal to a power amplifier for amplifying the signal and an impedance matching transformer coupled to said power amplifier for connecting said signal to said flow cell, said power source creating an electromagnetic field within said flow cell and creating an ionic current flow in said flow cell;

~~wherein said aqueous solution contains iron and~~ said ionic current flow generates hydroxyl radicals in said aqueous solution.

Claim 7 (currently amended): The electroionic apparatus of claim 1 ~~further comprising~~ wherein said flow cell includes a pair of opposed extended spaced-apart electrodes mounted in

aligned spaced relation to define spaced walls of a pipe or an open channel section with in said aqueous solution ~~flowing between said electrodes.~~

Claim 8 (currently amended): The electroionic apparatus of claim 1 further comprising monitoring means coupled to said flow cell for monitoring a plurality of parameters in said aqueous solution.

Claim 9 (currently amended): The electroionic apparatus of claim 8 wherein ~~the~~ said monitoring means includes ~~monitoring of hydrogen peroxide with an on-line ultraviolet (UV) spectrometer~~ a hydrogen peroxide analyzer for monitoring the amount of hydrogen peroxide in said aqueous solution.

Claim 10 (currently amended): The electroionic apparatus of claim 8 wherein ~~the~~ said monitoring means includes ~~monitoring dissolved oxygen in the water~~ a conductivity analyzer for monitoring the conductivity of said aqueous solution.

Claim 11 (currently amended): The electroionic apparatus of claim 8 wherein ~~the~~ said monitoring means includes a ~~fluorometric monitor~~ an on-line microbial analyzer to detect and quantify the ~~total~~ microbial population density of said ~~water~~ aqueous solution.

Claim 12 (currently amended): The electroionic apparatus of claim ~~11~~ 1 wherein said power ~~supply~~ source has an input control to adjust the power output level and ~~where said fluorometric monitor is connected to said input control of the power supply controller to adjust and~~ minimize electric power consumption.

Claim 13 (currently amended): A method for ~~electroionically processing aqueous solutions~~ electroionic disinfection and oxidation of an aqueous solution, the ~~methods~~ method comprising the steps of:

passing said aqueous ~~solutions~~ solution through a ~~passageway~~ flow cell; and

supplying ~~an a~~ a high frequency AC voltage across ~~power source~~ power source to said ~~electrodes and~~ flow cell, said ~~power source~~ power source including a ~~signal generator~~ signal generator supplying a ~~high frequency AC signal~~ high frequency AC signal to a ~~power amplifier~~ power amplifier for amplifying the signal and an ~~impedance matching transformer~~ impedance matching transformer coupled to said ~~power amplifier~~ power amplifier for connecting said signal to said ~~flow cell~~ flow cell, said ~~power source~~ power source creating an ~~electromagnetic field~~ electromagnetic field within said ~~flow cell~~ flow cell and creating ~~establishing~~ establishing an ~~ionic~~ ionic current flow between the ~~in~~ in said ~~electrodes~~ electrodes ~~flow cell~~ flow cell; and

~~creating ions of the material of said electrodes and operable for removal of contaminants from said aqueous solutions.~~

Claim 14 (currently amended): An electroionic apparatus for disinfection and/or oxidation of an aqueous solution comprising:

a flow cell through which said aqueous solution flows therethrough; and

~~an~~ a high frequency AC power source coupled to said flow cell, ~~said power source~~ said power source including a ~~signal generator~~ signal generator supplying a ~~high frequency AC signal~~ high frequency AC signal to a ~~power amplifier~~ power amplifier for amplifying the signal and an ~~impedance matching transformer~~ impedance matching transformer coupled to said ~~power amplifier~~ power amplifier for connecting said signal to said flow cell, said ~~power source~~ power source creating an ~~electromagnetic field~~ electromagnetic field within said flow cell and creating an ionic current flow in said flow cell;

~~wherein said AC power source is operable to create an electromagnetic field around said flow cell; and~~

~~wherein said aqueous solution flows through said flow cell for disinfecting and/or oxidizing said aqueous solution.~~

Claim 15 (currently amended): The electroionic apparatus of claim 14 ~~further comprising a resonant inductive capacitive and resistive (LCR) circuit coupled to said flow cell~~ wherein said flow cell is an inductive treatment cell including at least one coil wrapped around at least one core.

Claim 16 (currently amended): The electroionic apparatus of claim 15 ~~wherein said LCR circuit includes inductive, capacitive and resistive elements~~ further comprising a capacitor coupled to said at least one coil of said inductive treatment cell.

Claims 17-22 (canceled)

Claim 23 (original): The electroionic apparatus of claim 14 wherein said flow cell includes at least two spaced-apart electrodes.

Claim 24 (canceled)

Claim 25 (currently amended): The electroionic apparatus of claim 23 wherein ~~said spaced apart electrodes include a dielectric material coating at least one side of the electrodes to provide capacitive coupling~~ each of said electrodes includes a first surface and a second surface, wherein said first surface of each electrode is coated with a dielectric material having a low coefficient of friction, and wherein said dielectric material is in contact with said aqueous solution forming capacitively-coupled electrodes for capacitively-coupling said flow cell to said aqueous solution.

Claim 26 (currently amended): ~~The electroionic apparatus of claim 14~~ An electroionic apparatus for disinfection and/or oxidation of an aqueous solution comprising:
a flow cell through which said aqueous solution flows therethrough; and
a high frequency AC power source coupled to said flow cell, said power source including
a signal generator supplying a high frequency AC signal to a power amplifier for amplifying the
signal and an impedance matching transformer coupled to said power amplifier for connecting
said signal to said flow cell, said power source creating an electromagnetic field within said flow
cell and creating an ionic current flow in said flow cell;
wherein hydrogen peroxide is produced in said aqueous solution.

Claim 27 (currently amended): ~~The electroionic apparatus of claim 14~~ An electroionic apparatus for disinfection and/or oxidation of an aqueous solution comprising:
a flow cell through which said aqueous solution flows therethrough; and
a high frequency AC power source coupled to said flow cell, said power source including
a signal generator supplying a high frequency AC signal to a power amplifier for amplifying the
signal and an impedance matching transformer coupled to said power amplifier for connecting
said signal to said flow cell, said power source creating an electromagnetic field within said flow
cell and creating an ionic current flow in said flow cell;
wherein hydroxyl radicals are produced in said aqueous solution.

Claim 28 (currently amended): The electroionic apparatus of claim 14 further comprising monitoring means coupled to said flow cell for monitoring a plurality of parameters in said aqueous solution.

Claim 29 (currently amended): The electroionic apparatus of claim 28 wherein ~~the said~~ monitoring means ~~is used for measuring oxygen~~ includes a conductivity analyzer for monitoring the conductivity of said aqueous solution.

Claim 30 (currently amended): The electroionic apparatus of claim 28 wherein ~~the said~~ monitoring means ~~is used for measuring hydrogen peroxide~~ includes a hydrogen peroxide analyzer for monitoring the amount of hydrogen peroxide in said aqueous solution.

Claim 31 (currently amended): The electroionic apparatus of claim 28 wherein ~~the said~~ monitoring means ~~is used for measuring microbial populations~~ includes an on-line microbial analyzer to detect and quantify the microbial population density of said aqueous solution.

Claims 32-34 (canceled)

Claim 35 (currently amended): The electroionic apparatus of claim 14 wherein said power ~~supply~~ source includes an input control to adjust the power output level and minimize power consumption.

Claims 36-45 (canceled)

Claim 46 (currently amended): An electroionic apparatus for lowering organic compound concentrations in an aqueous solution comprising:

~~an AC power source coupled to a resonant inductive capacitive and resistive (LCR) circuit;~~

~~a flow cell coupled to said AC power supply and said LCR circuit;~~

~~said AC power source and LCR circuit operable to inductively create an electromagnetic field around said flow cell; and~~

~~wherein said aqueous solution flows through said flow cell to lower organics in said aqueous solution~~

an inductive treatment cell including at least one coil wrapped around at least one core, said inductive treatment cell positioned in a flow system through which said aqueous solution passes therethrough;

a capacitor coupled to said at least one coil of said inductive treatment cell; and

a high frequency AC power source coupled to said capacitor and said inductive treatment cell, said power source including a signal generator supplying a high frequency AC signal to a power amplifier for amplifying the signal and an impedance matching transformer coupled to said power amplifier for connecting said signal to said capacitor and said inductive treatment cell, said power source creating an electromagnetic field within said inductive treatment cell and creating an ionic current flow in said inductive treatment cell.

Claim 47 (currently amended): An electroionic apparatus for lowering organics in a aqueous solution comprising:

~~an AC power source coupled to an capacitive circuit;~~

~~a flow cell coupled to said AC power supply and said capacitive circuit;~~

~~said AC power source and capacitive circuit operable to create an electromagnetic field around said flow cell; and~~

~~wherein said aqueous solution flows through said flow cell to lower organics in said aqueous solution~~

a treatment cell including at least two spaced-apart electrodes positioned in a flow system through which said aqueous solution flows; and

a high frequency AC power source coupled to said electrodes in said treatment cell, said power source including a signal generator supplying a high frequency AC signal to a power amplifier for amplifying the signal and an impedance matching transformer coupled to said power amplifier for connecting said signal to said treatment cell, said power source creating an electromagnetic field within said treatment cell and creating an ionic current flow between said electrodes;

wherein each of said electrodes includes a first surface and a second surface, wherein said first surface of each electrode is coated with a dielectric material having a low coefficient of friction, and wherein said dielectric material is in contact with said aqueous solution forming capacitively-coupled electrodes for capacitively-coupling said treatment cell to said aqueous solution.

Claim 48 (currently amended): An electroionic apparatus for lowering organics in a an aqueous solution comprising:

~~an AC power source coupled to a resistive circuit;~~
~~a flow cell coupled to said AC power supply and said resistive circuit;~~
~~said AC power source and resistive circuit operable to create an electromagnetic field around said flow cell; and~~

~~wherein said aqueous solution flows through said flow cell to lower organics in said aqueous solution~~

a treatment cell including at least two spaced-apart electrodes positioned in a flow system through which said aqueous solution passes therethrough; and
a high frequency AC power source coupled to said electrodes in said treatment cell, said power source including a signal generator supplying a high frequency AC signal to a power amplifier for amplifying the signal and an impedance matching transformer coupled to said power amplifier for connecting said signal to said treatment cell, said power source creating an electromagnetic field within said treatment cell and creating an ionic current flow between said electrodes.

Claim 49 (currently amended): An electroionic apparatus for treating wastewater and/or potable water comprising:

a flow cell; and
~~an~~ a high frequency AC power source coupled to said flow cell, said power source including a signal generator supplying a high frequency AC signal to a power amplifier for amplifying the signal and an impedance matching transformer coupled to said power amplifier for connecting said signal to said flow cell, said power source creating an electromagnetic field within said flow cell and creating an ionic current flow in said flow cell;
~~said AC power source operable to create an electromagnetic field around said flow cell;~~
~~and~~
wherein said wastewater and/or potable water flows through said flow cell for disinfecting and oxidizing said ~~water~~ wastewater and/or potable water.

Claim 50 (currently amended): A flow cell assembly for disinfection of ~~water including~~ wastewater and/or potable water wherein said ~~water~~ wastewater and/or potable water flows through ~~said~~ a flow cell, said flow cell assembly comprising:

~~an~~ a high frequency AC power supply coupled to an electronic circuit which is coupled to said flow cell assembly ~~and operable to create an electromagnetic field in said flow cell assembly,~~ said power supply including a signal generator supplying a high frequency AC signal to a power amplifier for amplifying the signal and an impedance matching transformer coupled to said power amplifier for connecting said signal to said flow cell, said power supply creating an electromagnetic field within said flow cell and creating an ionic current flow in said flow cell.

Claim 51 (currently amended): A method for electroionically processing aqueous solutions, said method comprising the steps of:

passing said aqueous solutions through a flow cell; and
applying ~~an~~ a high frequency AC power source to said flow cell, said power source including a signal generator supplying a high frequency AC signal to a power amplifier for amplifying the signal and an impedance matching transformer coupled to said power amplifier for connecting said signal to said flow cell, said power source creating an electromagnetic field within said flow cell and creating an ionic current flow in said flow cell; ~~and~~
~~establishing an electromagnetic field around said flow cell for removing contaminants from said aqueous solutions.~~

Claim 52 (currently amended): A method for disinfecting and/or oxidizing aqueous solutions, the method comprising the steps of:

providing a flow cell for aqueous solutions to flow through said flow cell; and
applying ~~an~~ a high frequency AC power source to said flow cell, said power source
including a signal generator supplying a high frequency AC signal to a power amplifier for
amplifying the signal and an impedance matching transformer coupled to said power amplifier
for connecting said signal to said flow cell, said power source creating an electromagnetic field
within said flow cell and creating an ionic current flow in said flow cell;
~~creating an electromagnetic field around said flow cell; and~~
~~wherein said aqueous solution flows through said flow cell for disinfecting and/or~~
~~oxidizing said aqueous solutions.~~

Claim 53 (currently amended): A method of generating hydrogen peroxide, said method comprising the steps of:

applying ~~an~~ a high frequency AC power source to a ~~supply of water containing oxygen~~
flow cell with an aqueous solution flowing therethrough, said power source including a signal
generator supplying a high frequency AC signal to a power amplifier for amplifying the signal
and an impedance matching transformer coupled to said power amplifier for connecting said
signal to said flow cell, said power source creating an electromagnetic field within said flow cell
and creating an ionic current flow in said flow cell for generating hydrogen peroxide; and
~~creating an electromagnetic field around said tank for generating hydrogen peroxide.~~

Claim 54 (new): The electroionic apparatus of claim 8 further comprising a process controller coupled to and receiving inputs from said monitoring means and coupled to and generating an output to said signal generator for controlling operation of said AC power source.

Claim 55 (new): The electroionic apparatus of claim 54 further comprising a current sense coil and a current feedback loop coupled between said impedance matching transformer and said process controller for sensing current from said impedance matching transformer and adjusting the power output of said AC power source.

Claim 56 (new): The method of claim 13 further comprising the step of generating hydrogen peroxide in said aqueous solution.

Claim 57 (new): The method of claim 13 further comprising the step of generating hydroxyl radicals in said aqueous solution.

Claim 58 (new): The method of claim 13 further comprising the step of coupling a plurality of analyzers to said flow cell for monitoring a plurality of parameters in said aqueous solution.

Claim 59 (new): The method of claim 13 further comprising the step of coupling a hydrogen peroxide analyzer to said flow cell for monitoring the amount of hydrogen peroxide in said aqueous solution.

Claim 60 (new): The method of claim 13 further comprising the step of coupling an on-line microbial analyzer to said flow cell to detect and quantify the microbial population density of said aqueous solution.

Claim 61 (new): The method of claim 13 further comprising the step of coupling a conductivity analyzer to said flow cell for monitoring the conductivity of said aqueous solution.

Claim 62 (new): The method of claim 58 further comprising the step of coupling a process controller between said plurality of analyzers and said signal generator for controlling operation of said AC power source.

Claim 63 (new): The method of claim 62 further comprising the step of coupling a current sense coil and a current feedback loop between said impedance matching transformer and said process controller for sensing current from said impedance matching transformer and adjusting the power output of said AC power source.

Claim 64 (new): The electroionic apparatus of claim 46 wherein said inductive treatment cell is a high Q resonant LCR circuit.

Claim 65 (new): An electroionic apparatus for disinfection and oxidation of an aqueous solution comprising:

a high frequency AC power source coupled to a flow cell, said power source including a signal generator supplying a high frequency AC signal to a power amplifier for amplifying the signal and an impedance matching means for matching the impedance of said power source to said flow cell, said power source creating an electromagnetic field within said flow cell and creating an ionic current flow in said flow cell.